LESSON MAKER PRO

Growth Equation Lab

Solve equations and read exponential graphs.

HIGH SCHOOL · MA.912.AR.5

MA.912.AR.5 "Write, solve and graph exponential and logarithmic equations and functions in one and two variables."

NAME _____ DATE _____

MATCH AND MODEL

To solve $b^{expression} = b^{number}$, write both sides with the same base, then set the exponents equal. For $y = a(b^x)$, the graph starts at a when x = 0 and is multiplied by b each time x increases by 1.

WORKED EXAMPLE

The number line marks the solution. Solve $3^{x-2} = 9$ and check the marked location.



1. $3^{x-2} = 3^2$.
2. $x - 2 = 2$.
3. $x = 4$.
4. The marked point is 4.

Answer: x = 4

PRACTICE 4 problems

1 Solve $2^{x+1} = 16$.

ANSWER _____

2 Solve $\log_3(x) = 4$.

ANSWER _____

3 Solve $\log_2(x - 1) = 3$.

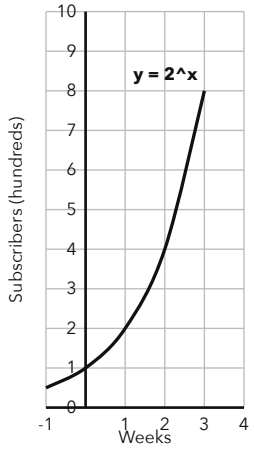
ANSWER _____

4 Write an exponential function with y-intercept 5 that doubles for each increase of 1 in x.

ANSWER _____

APPLY IT Show your work

1 A student channel has 100 subscribers at week 0 and doubles each week. The graph uses y in hundreds. Use the graph to find when it will have 800 subscribers.



ANSWER _____

2 A game designer tests a score multiplier $M = 4^x$, where x is the number of bonus rounds. The number line marks a proposed number of rounds. Will the multiplier equal 64? Give x.



ANSWER _____

CHALLENGE One step up

Solve $\log_2(x - 1) + \log_2(x - 3) = 3$. Explain why the other algebraic solution is rejected.

WORK SPACE AND ANSWER

ANSWER KEY

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Solve $2^{x+1} = 16$.	**x = 3**
2	Solve $\log_3(x) = 4$.	**x = 81**
3	Solve $\log_2(x - 1) = 3$.	**x = 9**
4	Write an exponential function with y-intercept 5 that doubles for each increase of 1 in x.	**$y = 5(2)^x$**

PART 2 · APPLY IT

1. **3 weeks** 800 subscribers is 8 hundreds. On the graph, y = 8 when x = 3.
2. **Yes, x = 3.** Since $64 = 4^3$, the proposed point x = 3 is correct.

CHALLENGE

x = 5. The other solution, x = -1, is rejected because x - 3 must be positive.

Accept equivalent exponential-function notation, such as $y = 5 \cdot 2^x$. For the challenge, accept any correct domain explanation that rejects x = -1.